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## Development of students' critical thinking: The educators' ability to use questioning skills in the baccalaureate programmes in nursing in Pakistan

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### Abstract

**Objective:** To enhance the Critical Thinking skills of educators associated with the nursing baccalaureate programmes in Pakistan. By focusing on the type and level of questions asked by the educators.

**Methods:** Ninety-one faculty members from 14 out of 17 schools participated in the study. Data on the faculty's questioning skills was obtained through classroom observations and field notes. The duration of the observations was 45-60 minutes. Using Bloom's Taxonomy for cognitive thinking, questions were categorised into high and low categories.

**Results:** Most of the questions (68.9 %) asked by the participants were of lower levels, while some (5.37 %) were ambiguous. In many instances, the participants did not allow a sufficient wait-time for students to think and respond.

**Conclusion:** The findings suggest that educators must learn to use the questioning strategy effectively. They should ask higher level questions if they wish to inculcate Critical Thinking in students.

**Keywords:** Critical thinking, Questioning skills, Baccalaureate, Nursing (JPMA 62: 200; 2012).

### Introduction

Critical thinking (CT) is identified as a fundamental competence expected of baccalaureate nursing students at the completion of their programme. CT is useful in analysing complex data, evaluating situations and actions, and implementing the most appropriate actions. It is a requirement for effective problem-solving and decision-making in all walks of life. In view of these characteristics, enhancement of CT is regarded as a valuable outcome for any programme in higher education, including nursing.<sup>1-5</sup> Developing the ability to think critically is influenced by many factors, including the learning environment and the instructor's competence and approach to teaching.<sup>6</sup> Above all, educators must recognise the value of CT and be prepared to promote it. For teachers to be able to prepare students to achieve higher level cognitive thinking, "they must first emulate higher level thinking in their instructional practices."<sup>7</sup> Facione and Facione emphasise that CT needs to be demonstrated, and that demands constant metacognitive reflection on "what one is doing and why".<sup>8</sup>

Thinking is not driven by answers but by questions. If experts, scientists, and philosophers had not asked questions, the foundations of fields of thought such as Physics, Biology and so forth would not have been developed in the first place. Furthermore, every field stays alive only to the extent that fresh questions are generated, which are then taken seriously as the driving force in the process of thinking. To think

through or rethink anything, one must ask questions that stimulate thought. Questions define tasks, express problems and delineate issues. Answers, on the other hand, often signal a full stop in thought. Only when an answer generates a further question does thought continue its life. Thus, effective questioning is considered one of the most important teaching strategies that involves students actively and promotes their Critical Thinking.

Bloom's taxonomy is a widely acknowledged classification system useful for designing questions.<sup>9</sup> Its six cognitive categories describe the level of question from lower to high order thinking skills. The last four levels — application, analysis, synthesis and evaluation — require high order thinking skills whereas the knowledge and comprehension are low level cognitive skills. The taxonomy suggests that in preparing to ask the questions, the teacher should select questions at an appropriate level for the learning outcomes, and phrase questions that promote the development of higher order thinking (Table-1).

According to Nicholl and Tracey,<sup>10</sup> low-level closed questions require the students to do no more than recite facts and figures or to recall information, while high-level challenging questions require them to go beyond simple recall and to engage in more sophisticated thinking so that deep learning occurs.<sup>11</sup> High order questions and open ended questions require students to use their knowledge to resolve a problem, reason, think deeply and critically, analyse, evaluate

and develop creative insights. In addition, such questions engage students in higher order cognitive processes. Although it is the primary responsibility of educators to develop CT of their students, Zygmunt and Schaeffer<sup>12</sup> concluded in their study that educators found it challenging to promote CT if they had not been trained how to inculcate CT in their educational system.

This issue appears to be the same in Pakistan since research in the Pakistani context, limited though it is, reveals that didactic teaching and rote learning are prevalent in most teaching institutions and disciplines. In a study regarding teachers' education in Pakistan, Davies and Iqbal<sup>13</sup> reported that the majority of teaching was lecture-based while notes were dictated to students. Some students did not take any notes, but just listened to the lectures and then used the textbooks to prepare for the examinations. Similarly, in 1998 a nationwide study, involving 17 schools of nursing in the public and private sectors in Pakistan was conducted to evaluate the implementation of the revised curriculum for a diploma programme in general nursing. This study clearly indicated that nursing students were not encouraged to think and ask questions. This was reflected in a comment made by a student: "If we say, 'I have not understood', we are told, 'No need to understand, just remember it'".<sup>14</sup> Considering the socio-cultural dimension of CT, the Pakistani learners may be viewed as members of a culture that does not encourage questioning people who by virtue of their age or position are in a position of authority.<sup>15</sup>

## Subjects and Methods

The project team for this study consisted of six faculty members from nursing and non-nursing disciplines (English and Basic Sciences) at a private university in Karachi, Pakistan.

Although the study used an interventional design with a pre- and post-test approach that consisted of three phases — pre-assessment, intervention and the post-assessment, this

paper reports on the educator's questioning skills observed in only the first phase of the study. Following a universal sampling technique in the first phase, all the full-time 148 faculty members teaching in the baccalaureate programmes in 16 schools of nursing in Pakistan were invited to participate in the study.

Approval was sought from the institutional review board and from the heads of participating nursing schools in the country. The participants were informed that participation in the study was entirely voluntary and that they could withdraw at any time. Confidentiality and anonymity of the participants were assured by using numerical codes instead of the participants' names.

Data was collected from April to December 2009, and with the consent from the participating teachers, their classroom teaching sessions were observed by the researchers. A structured observation list was used to determine the contextual factors, such as the physical and psychological environment of the classroom, which may influence the teachers' questioning skills. Moreover, the classroom discourses were tape-recorded in order to determine the quality of the teachers' questioning skills. The duration of the class observations for one session was between 45 to 60 minutes.

The recorded data on the teachers' questions was transcribed verbatim and verified with the voice files of teachers' recordings. The teachers' questions were categorised and coded into six levels of higher and lower order thinking questions using the Bloom's Taxonomy for cognitive thinking (Table-1).

## Results

With a response rate of 61%, a total of 91 faculty members from 14 institutions, both in public and private sectors, participated in the study. Demographic data indicates that of the 91 educators, 67% were females and 33% were males. Informed written consent was obtained from each faculty prior to data collection. The age of the participants

**Table-1: Bloom's Taxonomy.**

Knowledge	This is the lowest level of cognitive thinking that entails recalling facts or observations in the exact form that has been presented, or supplying specific factual information. It includes memorization of definitions, formulae or procedures. e.g. Which organ in the body produces insulin?
Comprehension	This level of thinking ability involves understanding the previously learned material. e.g. Explain conduction system of the heart?
Application	This level of cognition involves applying known rules and techniques to solve problem without being given the rule or formula to solve the problem. e.g. What principles of teaching and learning you must consider while making a discharge plan for a diabetic patient?
Analysis	This level of thinking entails the skills of making inferences, finding evidence to support generalization, skills required to break complex concepts or situations into their component parts, and analyze how these parts are related to one another. e.g. Why do cardiac patients come in emergency between 4 a.m -6a.m in the morning with chest pain?
Synthesis	This-level of thinking involves developing solutions to problems, making predictions or rearranging component parts to form a new whole. e.g. Suggest a nursing care plan for a patient .diagnosed with myocardial infarction?
Evaluation	This level is the highest level of cognitive skills and it refers to one's ability of making value judgments about a controversial issue, judging the validity of an argument or the worth of a concept and arriving at a reasoned judgment. e.g. What is the most appropriate nursing management for an elderly patient having stroke?

**Table-2: Distribution of sample by age and teaching experience.**

Age in years	Percentage	Experience in years
20-25	6.6	> 1
26-30	35.2	1-3
31-35	26.4	1.5-4
36-40	22	1.5-16
41-45	6.6	2-15
46-50	2.1	10-13
>50	1.1	11

**Table-3: Percentage distribution of questions asked by teachers.**

Type of Question	Cognitive Level High order/ Lower Level	Number of Questions	Percentage of Number of questions %
Knowledge	Low order	1121	32.9
Comprehension	Low order	869	25.5
Application	Low order	360	10.5
Analysis	High order	314	9.21
Synthesis	High order	76	2.23
Evaluation	High order	34	0.99
Ambiguous/Vague		183	5.37
Others:			
(Rhetoric, motivating, encouraging, probing emphasizing)		450	13.2
Total number of questions		3407	100

ranged between 20 and 55 years, the majority falling between 26 to 30 years. Their teaching experience ranged from 1-3 years. Most of the participants were nurse educators; out of whom 70% had completed a BScN degree and 58.3% were diploma holders (Table-2).

It is evident from the data that of 3407 the questions asked by the teachers, most were lower level questions (Table-3). Moreover, quite a few questions asked were ambiguous (5.37%). In many instances, the teachers did not allow sufficient time for the students to think and respond; instead, they answered the questions themselves. A majority of the questions (32.9%) asked by teachers were at the Knowledge level. These questions were primarily aimed at the students' recall of previously learned information. Moreover, a little over one-fourth (25.5 %) of the questions were used to judge whether students understood the meaning of the information given (Comprehension). Questions from these two cognitive levels were most prevalent in this study as these types of questions were used to obtain information from their teachers and/or their peers. This was followed by inquiring their ability to apply the learned knowledge. Within the high-level questions, approximately ten percent (10.5%) of the questions were at the Application level while only 12.43% asked were of the Analysis, Evaluation and Synthesis levels. These questions were used for probing, exploring or for elaboration.

In addition, a few (5.37 %) of the questions were

vague while a little over ten percent (13.2%) of the questions were rhetorical, affective, motivating or probing in nature. Moreover, field notes of the researchers' observations showed that most teachers did not give enough wait-time to students after posing a question. In fact, they were inclined to answer their own questions, which did not allow the students to think and respond. In addition, some teachers wrote questions on their power point presentation slides and had the answers written below on the same slide, which

made the question redundant as there was no need for the students to reflect and respond.

## Discussion

The findings of this study indicate that the learning environment in a classroom of undergraduate BScN programmes is not always stimulating enough to promote Critical Thinking. The findings reveal that most educators in the baccalaureate programme used lower level questions, for which answers could be predicted as they required limited thought from the students. Although the majority of the questions asked by the teachers were of the low level category, these types of questions are also important in order to reinforce knowledge acquisition at the basic level and cater to students' queries. Numerous research studies inform that many teachers use factual and lower level questions, which do not promote CT.<sup>10,16-18</sup> Lower level questioning, related to recall of Knowledge or Comprehension, is important while facilitating the teaching and learning process. However, to foster CT, nurse educators must develop skills to ask higher level questions that involve Analysis, Synthesis and Evaluation.<sup>19</sup> Wink suggests that often cognitively high-level questions are not asked because students did not have the fundamental knowledge and until that was well-developed they may not have the capacity, inclination and confidence to respond to or construct high-level questions.<sup>20</sup>

Consistent with the findings of other studies,<sup>16-18,21,22</sup> this study also revealed that most teachers used the closed

questioning technique which allows limited range of responses from students and involves the recall of simple facts, which can be done by rote-memorisation. Such responses entail a superficial understanding of the topic, whereas questions at higher levels of Bloom's Taxonomy are usually most appropriate for encouraging students to think more deeply and critically. They enhance students' problem solving capabilities, facilitate discussions and encourage them to seek information on their own.

Salpellah et al<sup>18</sup> in a study of questioning found that clinical teachers predominately asked questions from the lower order cognitive levels when actually effective questioning involves cognitive reasoning and critical thinking at an appropriate level for the student. By asking such type of questions, the teacher attempts to draw on and develop the student's level of thinking from a lower to a higher level. It is considered useful to use an educational hierarchy to ask questions, which moves from simple recall of information to the more difficult skills of cognitive reasoning and critical thinking.

Furthermore, unlike the findings of Profetto-McGrath et al.<sup>19</sup> and Sellappah et al,<sup>18</sup> in this study the percentage of rhetorical and vague questions that may indicate uncertainty or doubt were considerably high. This could perhaps be related to the educators' inadequate command of the English language in addition to their lack of knowledge in terms of using the questioning skills effectively.

In addition, with regards to the wait-time after posing a question, the average teacher's wait-time was found to be one second whereas Carin<sup>23</sup> concludes that the amount of time that elapses between a teacher asking a question and calling upon a student to answer that question is essential to the development of higher thought processes. Students need the wait-time to organise their thoughts. However, an increase in teacher wait-time up to 5 seconds or longer sets an atmosphere more conducive to productive questions, especially for "slow" or shy learners to formulate their answers.<sup>23</sup> Thus, the results of the study highlight the importance of training the educators in asking appropriate higher level questions and in using wait-time technique effectively to promote learners critical thinking.

## Conclusion

Educators need to increase the number of questions requiring Application, Analysis, Synthesis and Evaluation in order to activate and facilitate Critical Thinking. The art of questioning is a learned skill, therefore, nurse and non-educators can benefit from structured and regular trainings to keep themselves abreast of this skill.

As part of Continuing Education, workshops should be arranged to make educators more aware of the importance of classroom questioning.

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